

SEQUENCE LISTING

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Koetting, Oliver

Ritte, Gerhard
Steup, Martin

<120> Methods for identifying proteins with starch phosphorylating enzymatic activity

<130> 65084.000020

<140> Unassigned
<141> 2006-09-01

<150> PCT/EP2005/002454

<151> 2005-03-04

<150> EP04090483.1

<151> 2004-12-15

<150> EP04090121.7

<151> 2004-03-29

<150> EP04090087.0

<151> 2004-03-05

<150> US60/549,980 provisional

<151> 2004-03-05

<160> 46

<170> PatentIn version 3.1

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| Thr Arg Asn Ser Ser Ser Ser Leu Pro Arg Leu Val Asn Ile Thr His | |
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| aga gtt aat ctc agc cac caa tct cac cga ctc aga aac tcc aat tct | 144 |
| Arg Val Asn Leu Ser His Gln Ser His Arg Leu Arg Asn Ser Asn Ser | |
| 35 40 45 | |
| cgt ctc act tgc act gct act tct tct tcc acc att gag gaa caa cgg | 192 |
| Arg Leu Thr Cys Thr Ala Thr Ser Ser Ser Thr Ile Glu Glu Gln Arg | |
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| aag aag aaa gat gga tca gga acg aaa gtg agg ttg aat gtg agg tta | 240 |
| Lys Lys Lys Asp Gly Ser Gly Thr Lys Val Arg Leu Asn Val Arg Leu | |
| 65 70 75 80 | |
| gat cat caa gtt aat ttt ggt gac cat gtg gct atg ttt gga tca gct | 288 |
| Asp His Gln Val Asn Phe Gly Asp His Val Ala Met Phe Gly Ser Ala | |
| 85 90 95 | |
| aaa gag att ggt tca tgg aaa aag aaa tcg cct ttg aat tgg agt gag | 336 |
| Lys Glu Ile Gly Ser Trp Lys Lys Lys Ser Pro Leu Asn Trp Ser Glu | |
| 100 105 110 | |
| aat gga tgg gtt tgt gag ttg gaa ctt gac ggt ggt cag gtt ttg gag | 384 |
| Asn Gly Trp Val Cys Glu Leu Glu Leu Asp Gly Gly Gln Val Leu Glu | |
| 115 120 125 | |
| tat aag ttt gtc att gtt aag aat gat ggt tca ctt tca tgg gaa tct | 432 |
| Tyr Lys Phe Val Ile Val Lys Asn Asp Gly Ser Leu Ser Trp Glu Ser | |
| 130 135 140 | |
| ggt gat aat cgt gtc ctt aag gtt cca aat tct ggg aat ttt tct gtt | 480 |
| Gly Asp Asn Arg Val Leu Lys Val Pro Asn Ser Gly Asn Phe Ser Val | |
| 145 150 155 160 | |
| gtt tgt cat tgg gat gct act aga gaa acc ctt gat ttg cct cag gag | 528 |
| Val Cys His Trp Asp Ala Thr Arg Glu Thr Leu Asp Leu Pro Gln Glu | |
| 165 170 175 | |
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| Val Gly Asn Asp Asp Asp Val Gly Asp Gly Gly His Glu Arg Asp Asn | |
| 180 185 190 | |

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| cat His | gat Asp | gtt Val 195 | ggg Gly | gat Asp | gat Asp | aga Arg | gta Val 200 | gtg Val | gga Gly | agt Ser | gaa Glu | aat Asn 205 | ggg Gly | gcg Ala | cag Gln | 624 |
| ctt Leu | cag Gln 210 | aag Lys | agt Ser | aca Thr | ttg Leu | ggg Gly 215 | ggg Gly | caa Gln | tgg Trp | caa Gln | ggg Gly 220 | aaa Lys | gat Asp | gcg Ala | tcc Ser | 672 |
| ttt Phe 225 | atg Met | cgt Arg | tct Ser | aat Asn | gat Asp 230 | cat His | ggg Gly | aac Asn | aga Arg | gaa Glu 235 | gtt Val | ggg Gly | aga Arg | aat Asn | tgg Trp 240 | 720 |
| gat Asp | act Thr | agt Ser | ggg Gly | ctt Leu 245 | gaa Glu | ggg Gly | aca Thr | gct Ala | ctt Leu 250 | aag Lys | atg Met | gtt Val | gag Glu | ggg Gly 255 | gat Asp | 768 |
| cgc Arg | aac Asn | tct Ser | aag Lys 260 | aac Asn | tgg Trp | tgg Trp | aga Arg | aag Lys 265 | ctt Leu | gaa Glu | atg Met | gta Val | cgc Arg 270 | gag Glu | gtt Val | 816 |
| ata Ile | gtt Val | ggg Gly 275 | agt Ser | gtt Val | gag Glu | agg Arg | gag Glu 280 | gaa Glu | cga Arg | ttg Leu | aag Lys | gcg Ala 285 | ctc Leu | ata Ile | tac Tyr | 864 |
| tct Ser | gca Ala 290 | att Ile | tat Tyr | ttg Leu | aag Lys | tgg Trp 295 | ata Ile | aac Asn | aca Thr | ggg Gly | cag Gln 300 | att Ile | cct Pro | tgt Cys | ttt Phe | 912 |
| gaa Glu 305 | gat Asp | gga Gly | ggg Gly | cat His | cac His 310 | cgt Arg | cca Pro | aac Asn | agg Arg | cat His 315 | gcc Ala | gag Glu | att Ile | tcc Ser | aga Arg 320 | 960 |
| ctt Leu | ata Ile | ttc Phe | cgt Arg | gag Glu 325 | ttg Leu | gag Glu | cac His | att Ile | tgc Cys 330 | agt Ser | aag Lys | aaa Lys | gat Asp | gct Ala 335 | act Thr | 1008 |
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| ata Ile 370 | gcc Ala | cat His | cgg Arg | aat Asn | gat Asp | att Ile 375 | cct Pro | cat His | gat Asp | ctc Leu | aag Lys 380 | caa Gln | gaa Glu | atc Ile | aag Lys | 1152 |
| cat His 385 | acg Thr | ata Ile | caa Gln | aat Asn | aag Lys 390 | ctt Leu | cac His | cgg Arg | aat Asn | gct Ala 395 | ggg Gly | cca Pro | gaa Glu | gat Asp | cta Leu 400 | 1200 |
| att Ile | gca Ala | aca Thr | gaa Glu | gca Ala 405 | atg Met | ctt Leu | caa Gln | cga Arg | att Ile 410 | acc Thr | gag Glu | acc Thr | cca Pro | gga Gly 415 | aaa Lys | 1248 |
| tat Tyr | agt Ser | gga Gly | gac Asp 420 | ttt Phe | gtg Val | gag Glu | cag Gln | ttt Phe 425 | aaa Lys | ata Ile | ttc Phe | cat His | aat Asn 430 | gag Glu | ctt Leu | 1296 |
| aaa Lys | gat Asp | ttc Phe 435 | ttt Phe | aat Asn | gct Ala | gga Gly | agt Ser 440 | ctc Leu | act Thr | gaa Glu | cag Gln | ctt Leu 445 | gat Asp | tct Ser | atg Met | 1344 |

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| aaa Lys | att Ile 450 | tct Ser | atg Met | gat Asp | gat Asp | aga Arg 455 | ggt Gly | ctt Leu | tct Ser | gcg Ala 460 | ctc Leu | aat Asn | ttg Leu | ttt Phe | ttt Phe | 1392 |
| gaa Glu 465 | tgt Cys | aaa Lys | aag Lys | cgc Arg | ctt Leu 470 | gac Asp | aca Thr | tca Ser | gga Gly | gaa Glu 475 | tca Ser | agc Ser | aat Asn | gtt Val | ttg Leu 480 | 1440 |
| gag Glu | ttg Leu | att Ile | aaa Lys | acc Thr 485 | atg Met | cat His | tct Ser | cta Leu | gct Ala 490 | tct Ser | tta Leu | aga Arg | gaa Glu | aca Thr 495 | att Ile | 1488 |
| ata Ile | aag Lys | gaa Glu | ctt Leu 500 | aat Asn | agc Ser | ggc Gly | ttg Leu | cga Arg 505 | aat Asn | gat Asp | gct Ala | cct Pro | gat Asp 510 | act Thr | gcc Ala | 1536 |
| att Ile | gca Ala | atg Met 515 | cgc Arg | cag Gln | aag Lys | tgg Trp | cgc Arg 520 | ctt Leu | tgt Cys | gag Glu | atc Ile | ggc Gly 525 | ctc Leu | gag Glu | gac Asp | 1584 |
| tac Tyr | ttt Phe 530 | ttt Phe | gtt Val | cta Leu | cta Leu | agc Ser 535 | aga Arg | ttc Phe | ctc Leu | aat Asn | gct Ala 540 | ctt Leu | gaa Glu | act Thr | atg Met | 1632 |
| gga Gly 545 | gga Gly | gct Ala | gat Asp | caa Gln | ctg Leu 550 | gca Ala | aaa Lys | gat Asp | gtg Val | gga Gly 555 | tca Ser | aga Arg | aac Asn | gtt Val | gcc Ala 560 | 1680 |
| tca Ser | tgg Trp | aat Asn | gat Asp | cca Pro 565 | cta Leu | gat Asp | gct Ala | ttg Leu | gtg Val 570 | ttg Leu | ggt Gly | gtt Val | cac His | caa Gln 575 | gta Val | 1728 |
| ggt Gly | cta Leu | tct Ser | ggt Gly 580 | tgg Trp | aag Lys | caa Gln | gaa Glu | gaa Glu 585 | tgt Cys | tta Leu | gcc Ala | att Ile | gga Gly 590 | aat Asn | gaa Glu | 1776 |
| ctc Leu | ctt Leu | gct Ala 595 | tgg Trp | cga Arg | gaa Glu | agg Arg | gac Asp 600 | cta Leu | ctt Leu | gaa Glu | aaa Lys | gaa Glu 605 | ggg Gly | gaa Glu | gag Glu | 1824 |
| gat Asp | gga Gly 610 | aaa Lys | aca Thr | att Ile | tgg Trp | gcc Ala 615 | atg Met | agg Arg | ctg Leu | aaa Lys | gca Ala 620 | act Thr | ctt Leu | gat Asp | cga Arg | 1872 |
| gca Ala 625 | cgc Arg | aga Arg | tta Leu | aca Thr | gca Ala 630 | gaa Glu | tat Tyr | tct Ser | gat Asp | ttg Leu 635 | ctt Leu | ctt Leu | caa Gln | ata Ile | ttt Phe 640 | 1920 |
| cct Pro | cct Pro | aat Asn | gtg Val | gag Glu 645 | att Ile | tta Leu | gga Gly | aaa Lys | gct Ala 650 | cta Leu | gga Gly | att Ile | cca Pro | gag Glu 655 | aat Asn | 1968 |
| agt Ser | gtc Val | aag Lys | acc Thr 660 | tat Tyr | aca Thr | gaa Glu | gca Ala | gag Glu 665 | att Ile | cgt Arg | gct Ala | gga Gly 670 | att Ile | att Ile | ttc Phe | 2016 |
| cag Gln | atc Ile | tca Ser 675 | aag Lys | ctc Leu | tgc Cys | act Thr | gtt Val 680 | ctt Leu | cta Leu | aaa Lys | gct Ala | gta Val 685 | aga Arg | aat Asn | tca Ser | 2064 |
| ctt Leu | ggt Gly 690 | tct Ser | gag Glu | ggc Gly | tgg Trp | gat Asp 695 | gtc Val | gtt Val | gta Val | cct Pro | gga Gly 700 | tcg Ser | acg Thr | tct Ser | ggg Gly | 2112 |

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| aca Thr 705 | tta Leu | ggt Val | cag Gln | ggt Val | gag Glu 710 | agc Ser | att Ile | ggt Val | ccg Pro | gga Gly 715 | tca Ser | ttg Leu | cca Pro | gca Ala | act Thr 720 | 2160 |
| tct Ser | ggt Gly | ggt Gly | cct Pro | att Ile 725 | att Ile | ctc Leu | ttg Leu | gtc Val | aat Asn 730 | aaa Lys | gct Ala | gat Asp | ggc Gly 735 | gat Asp | gaa Glu | 2208 |
| gag Glu | gta Val | agt Ser | gct Ala 740 | gct Ala | aat Asn | ggg Gly | aac Asn | ata Ile 745 | gct Ala | gga Gly | gtc Val | atg Met | ctt Leu 750 | ctg Leu | cag Gln | 2256 |
| gag Glu | ctg Leu | cct Pro 755 | cac His | ttg Leu | tct Ser | cac His | ctt Leu 760 | ggc Gly | ggt Val | aga Arg | gcg Ala | cgg Arg 765 | cag Gln | gag Glu | aaa Lys | 2304 |
| att Ile | gtc Val 770 | ttt Phe | gtg Val | aca Thr | tgt Cys | gat Asp 775 | gat Asp | gat Asp | gac Asp | aag Lys | ggt Val 780 | gct Ala | gat Asp | ata Ile | cga Arg | 2352 |
| cga Arg 785 | ctt Leu | gtg Val | gga Gly | aaa Lys | ttt Phe 790 | gtg Val | agg Arg | ttg Leu | gaa Glu | gca Ala 795 | tct Ser | cca Pro | agt Ser | cat His | gtg Val 800 | 2400 |
| aat Asn | ctg Leu | ata Ile | ctt Leu | tca Ser 805 | act Thr | gag Glu | ggt Gly | agg Arg | agt Ser 810 | cgc Arg | act Thr | tcc Ser | aaa Lys | tcc Ser 815 | agt Ser | 2448 |
| gcg Ala | acc Thr | aaa Lys | aaa Lys 820 | acg Thr | gat Asp | aag Lys | aac Asn | agc Ser 825 | tta Leu | tct Ser | aag Lys | aaa Lys | aaa Lys 830 | aca Thr | gat Asp | 2496 |
| aag Lys | aag Lys | agc Ser 835 | tta Leu | tct Ser | atc Ile | gat Asp | gat Asp 840 | gaa Glu | gaa Glu | tca Ser | aag Lys | cct Pro 845 | ggt Gly | tcc Ser | tca Ser | 2544 |
| tct Ser | tcc Ser 850 | aat Asn | agc Ser | ctc Leu | ctt Leu | tac Tyr 855 | tct Ser | tcc Ser | aag Lys | gat Asp | atc Ile 860 | cct Pro | agt Ser | gga Gly | gga Gly | 2592 |
| atc Ile 865 | ata Ile | gca Ala | ctt Leu | gct Ala | gat Asp 870 | gca Ala | gat Asp | gta Val | cca Pro | act Thr 875 | tct Ser | ggt Gly | tca Ser | aaa Lys | tct Ser 880 | 2640 |
| gct Ala | gca Ala | tgt Cys | ggt Gly | ctt Leu 885 | ctt Leu | gca Ala | tct Ser | tta Leu | gca Ala 890 | gaa Glu | gcc Ala | tct Ser | agt Ser | aaa Lys 895 | gtg Val | 2688 |
| cac His | agc Ser | gaa Glu | cac His 900 | gga Gly | ggt Val | ccg Pro | gca Ala | tca Ser 905 | ttt Phe | aag Lys | ggt Val | cca Pro | act Thr 910 | gga Gly | ggt Val | 2736 |
| gtc Val | ata Ile | cct Pro 915 | ttt Phe | gga Gly | tcg Ser | atg Met | gaa Glu 920 | tta Leu | gct Ala | tta Leu | aag Lys | caa Gln 925 | aat Asn | aat Asn | tcg Ser | 2784 |
| gaa Glu 930 | gaa Glu | aag Lys | ttt Phe | gcg Ala | tct Ser | ttg Leu 935 | cta Leu | gaa Glu | aaa Lys | cta Leu | gaa Glu 940 | acc Thr | gcc Ala | aga Arg | cct Pro | 2832 |
| gag Glu 945 | ggt Gly | ggt Gly | gag Glu | cta Leu | gac Asp 950 | gac Asp | ata Ile | tgt Cys | gac Asp | cag Gln 955 | atc Ile | cat His | gaa Glu | gtg Val | atg Met 960 | 2880 |

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| aaa acg ttg caa gtg cct aaa gaa aca atc aac agc ata agc aaa gcg Lys Thr Leu Gln Val Pro Lys Glu Thr Ile Asn Ser Ile Ser Lys Ala 965 970 975 | 2928 |
| ttt ctc aaa gat gct cgt ctc att gtt cgt tca agt gct aac gtc gag Phe Leu Lys Asp Ala Arg Leu Ile Val Arg Ser Ser Ala Asn Val Glu 980 985 990 | 2976 |
| gac tta gcc gga atg tca gct gca gga ctc tat gaa tca atc cct aac Asp Leu Ala Gly Met Ser Ala Ala Gly Leu Tyr Glu Ser Ile Pro Asn 995 1000 1005 | 3024 |
| gtg agt ccc tcg gat cct ttg gtg ttt tca gat tcg gtt tgc caa Val Ser Pro Ser Asp Pro Leu Val Phe Ser Asp Ser Val Cys Gln 1010 1015 1020 | 3069 |
| gtt tgg gct tct ctc tac aca aga aga gct gtt cta agc cgt aga Val Trp Ala Ser Leu Tyr Thr Arg Arg Ala Val Leu Ser Arg Arg 1025 1030 1035 | 3114 |
| gct gct ggt gtc tct caa aga gaa gct tca atg gct gtt ctc gtt Ala Ala Gly Val Ser Gln Arg Glu Ala Ser Met Ala Val Leu Val 1040 1045 1050 | 3159 |
| caa gaa atg ctt tcg ccg gac tta tca ttc gtt ctg cac aca gtg Gln Glu Met Leu Ser Pro Asp Leu Ser Phe Val Leu His Thr Val 1055 1060 1065 | 3204 |
| agt cca gct gat ccg gac agt aac ctt gtg gaa gcc gag atc gct Ser Pro Ala Asp Pro Asp Ser Asn Leu Val Glu Ala Glu Ile Ala 1070 1075 1080 | 3249 |
| cct ggt tta ggt gag act tta gct tca gga aca aga gga aca cca Pro Gly Leu Gly Glu Thr Leu Ala Ser Gly Thr Arg Gly Thr Pro 1085 1090 1095 | 3294 |
| tgg aga ctc gct tcg ggt aag ctc gac ggg att gta caa acc tta Trp Arg Leu Ala Ser Gly Lys Leu Asp Gly Ile Val Gln Thr Leu 1100 1105 1110 | 3339 |
| gct ttc gca aac ttc agc gaa gag ctt ctt gtg tca gga aca ggt Ala Phe Ala Asn Phe Ser Glu Glu Leu Leu Val Ser Gly Thr Gly 1115 1120 1125 | 3384 |
| cct gct gat gga aaa tac gtt cgg ttg acc gtg gac tat agc aaa Pro Ala Asp Gly Lys Tyr Val Arg Leu Thr Val Asp Tyr Ser Lys 1130 1135 1140 | 3429 |
| aaa cgt tta act gtt gac tcg gtg ttt aga cag cag ctc ggt cag Lys Arg Leu Thr Val Asp Ser Val Phe Arg Gln Gln Leu Gly Gln 1145 1150 1155 | 3474 |
| aga ctc ggt tcg gtt ggt ttc ttc ttg gaa aga aac ttt ggc tgt Arg Leu Gly Ser Val Gly Phe Phe Leu Glu Arg Asn Phe Gly Cys 1160 1165 1170 | 3519 |
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Arg Leu Thr Cys Thr Ala Thr Ser Ser Ser Thr Ile Glu Glu Gln Arg
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Lys Lys Lys Asp Gly Ser Gly Thr Lys Val Arg Leu Asn Val Arg Leu
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Asp His Gln Val Asn Phe Gly Asp His Val Ala Met Phe Gly Ser Ala
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Val Cys His Trp Asp Ala Thr Arg Glu Thr Leu Asp Leu Pro Gln Glu
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His Asp Val Gly Asp Asp Arg Val Val Gly Ser Glu Asn Gly Ala Gln
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Ser Ala Ile Tyr Leu Lys Trp Ile Asn Thr Gly Gln Ile Pro Cys Phe
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Pro Glu Glu Val Leu Val Ala Arg Lys Ile His Pro Cys Leu Pro Ser
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Phe Lys Ala Glu Phe Thr Ala Ala Val Pro Leu Thr Arg Ile Arg Asp
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His Thr Ile Gln Asn Lys Leu His Arg Asn Ala Gly Pro Glu Asp Leu
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Lys Ile Ser Met Asp Asp Arg Gly Leu Ser Ala Leu Asn Leu Phe Phe
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 580 585 590

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Asp Gly Lys Thr Ile Trp Ala Met Arg Leu Lys Ala Thr Leu Asp Arg
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Ala Arg Arg Leu Thr Ala Glu Tyr Ser Asp Leu Leu Leu Gln Ile Phe
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Pro Pro Asn Val Glu Ile Leu Gly Lys Ala Leu Gly Ile Pro Glu Asn
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Ser Val Lys Thr Tyr Thr Glu Ala Glu Ile Arg Ala Gly Ile Ile Phe
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Gln Ile Ser Lys Leu Cys Thr Val Leu Leu Lys Ala Val Arg Asn Ser
 675 680 685

Leu Gly Ser Glu Gly Trp Asp Val Val Val Pro Gly Ser Thr Ser Gly
 690 695 700

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 705 710 715 720

Phe Leu Lys Asp Ala Arg Leu Ile Val Arg Ser Ser Ala Asn Val Glu
 980 985 990
 Asp Leu Ala Gly Met Ser Ala Ala Gly Leu Tyr Glu Ser Ile Pro Asn
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 Val Ser Pro Ser Asp Pro Leu Val Phe Ser Asp Ser Val Cys Gln
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| | Met | Thr | Ser | Leu | Arg | Pro | Leu | Glu | Thr | Ser | Leu | Ser | Ile | | |
| | 1 | | | | 5 | | | | 10 | | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| ggc | ggc | agg | ccg | cgc | cgt | ggt | ctc | gtc | ctc | ccg | ccg | ccc | gga | gtc | ggt | 99 |
| Gly | Gly | Arg | Pro | Arg | Arg | Gly | Leu | Val | Leu | Pro | Pro | Pro | Gly | Val | Gly | |
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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gcg | ggt | gtg | ctg | ctc | cgc | cg | gga | gcg | atg | gcg | ctc | cct | ggg | cg | cgc | 147 |
| Ala | Gly | Val | Leu | Leu | Arg | Arg | Gly | Ala | Met | Ala | Leu | Pro | Gly | Arg | Arg | |
| 30 | | | | | 35 | | | | | 40 | | | | | 45 | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ggc | ttc | gcg | tgc | cgc | ggg | aga | tcc | gcg | gcc | tcg | gcg | gca | gag | aga | aca | 195 |
| Gly | Phe | Ala | Cys | Arg | Gly | Arg | Ser | Ala | Ala | Ser | Ala | Ala | Glu | Arg | Thr | |
| | | | | 50 | | | | | 55 | | | | | 60 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| aag | gag | aaa | aag | aga | aga | gat | tct | tca | aag | cag | cca | ttg | gtg | cat | ctc | 243 |
| Lys | Glu | Lys | Lys | Arg | Arg | Asp | Ser | Ser | Lys | Gln | Pro | Leu | Val | His | Leu | |
| | | | 65 | | | | | 70 | | | | | 75 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| cag | gtt | tgt | cta | gag | cac | cag | gtt | aag | ttt | ggt | gag | cat | gta | ggc | att | 291 |
| Gln | Val | Cys | Leu | Glu | His | Gln | Val | Lys | Phe | Gly | Glu | His | Val | Gly | Ile | |
| | | 80 | | | | | 85 | | | | | 90 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| atc | ggt | tcc | aca | aag | gag | ctt | ggt | tca | tgg | gag | gag | cag | gtt | gaa | ctg | 339 |
| Ile | Gly | Ser | Thr | Lys | Glu | Leu | Gly | Ser | Trp | Glu | Glu | Gln | Val | Glu | Leu | |
| | 95 | | | | | 100 | | | | 105 | | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gaa | tgg | act | aca | aat | ggt | tgg | gtc | tgc | cag | ctt | aag | ctc | cct | gga | gaa | 387 |
| Glu | Trp | Thr | Thr | Asn | Gly | Trp | Val | Cys | Gln | Leu | Lys | Leu | Pro | Gly | Glu | |
| 110 | | | | | 115 | | | | | 120 | | | | | 125 | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| aca | ctt | gtg | gag | ttt | aaa | ttt | gtt | ata | ttt | ttg | gtg | gga | gga | aaa | gat | 435 |
| Thr | Leu | Val | Glu | Phe | Lys | Phe | Val | Ile | Phe | Leu | Val | Gly | Gly | Lys | Asp | |
| | | | | 130 | | | | | 135 | | | | | 140 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| aaa | ata | tgg | gaa | gat | ggt | aat | aac | cgt | gtt | gtt | gag | ctg | ccg | aag | gat | 483 |
| Lys | Ile | Trp | Glu | Asp | Gly | Asn | Asn | Arg | Val | Val | Glu | Leu | Pro | Lys | Asp | |
| | | | 145 | | | | | 150 | | | | | 155 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ggt | aag | ttt | gat | ata | gta | tgc | cac | tgg | aat | aga | aca | gaa | gag | cca | tta | 531 |
| Gly | Lys | Phe | Asp | Ile | Val | Cys | His | Trp | Asn | Arg | Thr | Glu | Glu | Pro | Leu | |
| | | 160 | | | | 165 | | | | | | 170 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gaa | ctt | tta | gga | aca | cca | aag | ttt | gag | ttg | gtc | gga | gaa | gct | gaa | aag | 579 |
| Glu | Leu | Leu | Gly | Thr | Pro | Lys | Phe | Glu | Leu | Val | Gly | Glu | Ala | Glu | Lys | |
| | | | | | | | | | | | | | | | | |

| 175 | 180 | 185 | |
|-------------------|-------------------|-------------------|-------------------|
| aat Asn 190 | act Thr | ggc Gly | gag Glu |
| gat Asp | gct Ala 195 | tca Ser | gca Ala |
| tct Ser | gta Val | act Thr 200 | ttt Phe |
| gca Ala | cct Pro | gaa Glu | aaa Lys 205 |
| 627 | | | |
| ggt Val | caa Gln | gat Asp | att Ile |
| tca Ser 210 | ggt Val | ggt Gly 215 | gag Glu |
| gag Glu | caa Gln | gga Gly | agt Ser |
| aaa Lys 225 | ttt Phe | aaa Lys | act Thr 235 |
| ggt Gly | ggg Gly | caa Gln | ggt Val |
| ttc Phe | | | |
| 723 | | | |
| atg Met | aga Arg | tca Ser 240 | aat Asn |
| gag Glu | cat His | ctg Leu | aat Asn 245 |
| aag Lys | gag Glu | gct Ala | gat Asp |
| agg Arg 250 | atg Met | tgg Trp | gat Asp |
| 771 | | | |
| aca Thr | act Thr 255 | ggg Gly | ctt Leu |
| gat Asp | gga Gly | ata Ile 260 | gca Ala |
| ctg Leu | aaa Lys | ctg Leu | gtg Val 265 |
| gag Glu | ggc Gly | gat Asp | aaa Lys |
| 819 | | | |
| gca Ala 270 | tcc Ser | agg Arg | aac Asn |
| tgg Trp | tgg Trp 275 | cgg Arg | aag Lys |
| tta Leu | gag Glu | ggt Val 280 | ggt Val |
| cgc Arg | ggg Gly | ata Ile | ttg Leu 285 |
| 867 | | | |
| tca Ser | gaa Glu | tct Ser | ttt Phe |
| gat Asp 290 | gac Asp | cag Gln | agt Ser |
| cgt Arg | ctg Leu 295 | ggg Gly | gcc Ala |
| ctt Leu | gta Val | tac Tyr 300 | tca Ser |
| 915 | | | |
| gct Ala | att Ile | tat Tyr | ctg Leu 305 |
| aag Lys | tgg Trp | att Ile | tat Tyr |
| aca Thr 310 | ggt Gly | cag Gln | ata Ile |
| tcg Ser | tgc Cys 315 | ttt Phe | gaa Glu |
| 963 | | | |
| gat Asp | ggt Gly | ggc Gly 320 | cac His |
| cat His | cgg Arg | cct Pro | aac Asn 325 |
| aaa Lys | cat His | gct Ala | gag Glu |
| ata Ile 330 | tcg Ser | agg Arg | caa Gln |
| 1011 | | | |
| ata Ile | ttc Phe 335 | cgt Arg | gaa Glu |
| ctt Leu | gaa Glu | atg Met 340 | atg Met |
| tat Tyr | tat Tyr | ggg Gly | aaa Lys 345 |
| acc Thr | aca Thr | tca Ser | gcc Ala |
| 1059 | | | |
| aag Lys 350 | gat Asp | ggt Val | ctc Leu |
| gtg Val 355 | att Ile | cgc Arg | aaa Lys |
| att Ile | cat His | ccc Pro 360 | ttt Phe |
| tta Leu | cct Pro | tca Ser | ttt Phe 365 |
| 1107 | | | |
| aag Lys | tca Ser | gag Glu | ttt Phe |
| aca Thr 370 | gcc Ala | tct Ser | gtc Val |
| cct Pro | cta Leu 375 | aca Thr | cga Arg |
| att Ile | cgt Arg | gat Asp 380 | att Ile |
| 1155 | | | |
| gct Ala | cac His | cgg Arg | aat Asn 385 |
| gac Asp | atc Ile | cca Pro | cat His |
| gat Asp 390 | ctc Leu | aag Lys | caa Gln |
| gaa Glu | atc Ile 395 | aag Lys | cat His |
| 1203 | | | |
| act Thr | ata Ile | caa Gln 400 | aac Asn |
| aaa Lys | ctt Leu | cat His | cgt Arg 405 |
| aat Asn | gct Ala | gga Gly | cct Pro |
| gag Glu 410 | gat Asp | ctt Leu | att Ile |
| 1251 | | | |
| gct Ala | aca Thr 415 | gaa Glu | gtc Val |
| atg Met | ctt Leu | gct Ala 420 | agg Arg |
| att Ile | act Thr | aag Lys | acc Thr 425 |
| cct Pro | gga Gly | gaa Glu | tac Tyr |
| 1299 | | | |
| agt Ser | gaa Glu | aca Thr | ttt Phe |
| gtt Val | gaa Glu | caa Gln | ttc Phe |
| acg Thr | ata Ile | ttt Phe | tat Tyr |
| agc Ser | gaa Glu | cta Leu | aaa Lys |
| 1347 | | | |

| 430 | | | | | 435 | | | | | 440 | | | | | 445 | |
|-------------------|------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| gat Asp | ttc Phe | ttc Phe | aat Asn | gct Ala 450 | ggc Gly | agc Ser | cta Leu | ttt Phe | gag Glu 455 | caa Gln | ctg Leu | gag Glu | tcc Ser | atc Ile 460 | aag Lys | 1395 |
| gaa Glu | tct Ser | ctg Leu | aac Asn 465 | gag Glu | tca Ser | ggc Gly | tta Leu | gaa Glu 470 | gtt Val | ctc Leu | tca Ser | tcc Ser | ttt Phe 475 | gtg Val | gaa Glu | 1443 |
| acc Thr | aaa Lys | agg Arg 480 | agt Ser | ttg Leu | gac Asp | caa Gln | gtg Val 485 | gat Asp | cat His | gca Ala | gaa Glu | gat Asp 490 | ttg Leu | gat Asp | aaa Lys | 1491 |
| aat Asn 495 | gat Asp | acc Thr | att Ile | caa Gln | att Ile | ttg Leu 500 | atg Met | act Thr | acc Thr | ttg Leu | caa Gln 505 | tca Ser | tta Leu | tct Ser | tct Ser | 1539 |
| cta Leu 510 | aga Arg | tcg Ser | gtt Val | cta Leu | atg Met 515 | aag Lys | ggc Gly | ctt Leu | gaa Glu | agt Ser 520 | ggc Gly | ctt Leu | aga Arg | aat Asn | gat Asp 525 | 1587 |
| gcg Ala | cct Pro | gat Asp | aat Asn | gct Ala 530 | ata Ile | gca Ala | atg Met | cga Arg | caa Gln 535 | aag Lys | tgg Trp | cgc Arg | ctt Leu | tgt Cys 540 | gaa Glu | 1635 |
| att Ile | agt Ser | ctt Leu | gag Glu 545 | gat Asp | tat Tyr | tca Ser | ttt Phe | gtt Val 550 | ctg Leu | tta Leu | agc Ser | aga Arg | ttc Phe 555 | atc Ile | aat Asn | 1683 |
| act Thr | ctt Leu | gaa Glu 560 | gcc Ala | tta Leu | ggc Gly | gga Gly | tca Ser 565 | gct Ala | tca Ser | ctt Leu | gca Ala | aag Lys 570 | gat Asp | gta Val | gct Ala | 1731 |
| aga Arg 575 | aat Asn | act Thr | act Thr | cta Leu | tgg Trp | gat Asp 580 | act Thr | act Thr | ctt Leu | gat Asp | gcc Ala 585 | ctt Leu | gtc Val | att Ile | ggc Gly | 1779 |
| atc Ile 590 | aat Asn | caa Gln | gtt Val | agc Ser | ttt Phe 595 | tca Ser | ggc Gly | tgg Trp | aaa Lys | aca Thr 600 | gat Asp | gaa Glu | tgt Cys | att Ile | gcc Ala 605 | 1827 |
| ata Ile | ggg Gly | aat Asn | gag Glu | att Ile 610 | ctt Leu | tcc Ser | tgg Trp | aag Lys | caa Gln 615 | aaa Lys | ggc Gly | cta Leu | tct Ser | gaa Glu 620 | agt Ser | 1875 |
| gaa Glu | ggc Gly | tgt Cys | gaa Glu 625 | gat Asp | ggg Gly | aaa Lys | tat Tyr | att Ile 630 | tgg Trp | tca Ser | cta Leu | aga Arg | ctt Leu 635 | aaa Lys | gct Ala | 1923 |
| aca Thr | ctg Leu | gac Asp 640 | aga Arg | gca Ala | cgg Arg | aga Arg | tta Leu 645 | acg Thr | gaa Glu | gag Glu | tac Tyr | tct Ser 650 | gaa Glu | gca Ala | ctt Leu | 1971 |
| ctt Leu 655 | tct Ser | ata Ile | ttc Phe | cct Pro | gaa Glu | aaa Lys 660 | gta Val | atg Met | gtt Val | att Ile | ggg Gly 665 | aaa Lys | gcc Ala | ctt Leu | gga Gly | 2019 |
| ata Ile 670 | cca Pro | gat Asp | aac Asn | agt Ser | gtg Val 675 | aga Arg | act Thr | tac Tyr | aca Thr | gag Glu 680 | gca Ala | gaa Glu | att Ile | cgt Arg | gct Ala 685 | 2067 |
| ggc Gly | att Ile | gtt Val | ttt Phe | cag Gln | gta Val | tct Ser | aaa Lys | cta Leu | tgc Cys | aca Thr | gta Val | ctt Leu | cag Gln | aaa Lys | gca Ala | 2115 |

| 690 | | | | 695 | | | | 700 | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| att Ile | cga Arg | gaa Glu | gta Val 705 | ctt Leu | gga Gly | tca Ser | act Thr | ggc Gly 710 | tgg Trp | gat Asp | gtt Val | ctt Leu | gtt Val 715 | cct Pro | gga Gly | 2163 |
| gtg Val | gcc Ala | cat His 720 | gga Gly | act Thr | ctg Leu | atg Met | cgg Arg 725 | gtg Val | gaa Glu | aga Arg | att Ile | ctt Leu 730 | cct Pro | gga Gly | tca Ser | 2211 |
| tta Leu | cct Pro 735 | tca Ser | tct Ser | gtc Val | aaa Lys | gaa Glu 740 | cct Pro | gtg Val | gtt Val | cta Leu | att Ile 745 | gta Val | gat Asp | aag Lys | gct Ala | 2259 |
| gat Asp 750 | gga Gly | gat Asp | gaa Glu | gag Glu | gtc Val 755 | aaa Lys | gct Ala | gct Ala | ggg Gly | gat Asp 760 | aat Asn | ata Ile | gtt Val | ggg Gly | gtt Val 765 | 2307 |
| att Ile | ctt Leu | ctt Leu | cag Gln 770 | gaa Glu | cta Leu | cct Pro | cac His | ctt Leu | tca Ser 775 | cat His | ctt Leu | ggg Gly | gtt Val | aga Arg 780 | gct Ala | 2355 |
| cgt Arg | caa Gln | gag Glu | aat Asn 785 | gtt Val | gta Val | ttt Phe | gta Val | act Thr 790 | tgt Cys | gaa Glu | tat Tyr | gat Asp | gac Asp 795 | aca Thr | gtt Val | 2403 |
| aca Thr | gat Asp | gtg Val 800 | tat Tyr | ttg Leu | ctt Leu | gag Glu | gga Gly 805 | aaa Lys | tat Tyr | atc Ile | aga Arg | tta Leu 810 | gaa Glu | gca Ala | tca Ser | 2451 |
| tcc Ser | atc Ile 815 | aat Asn | gtc Val | aat Asn | ctc Leu | tca Ser 820 | ata Ile | gtt Val | tca Ser | gaa Glu | aaa Lys 825 | aat Asn | gac Asp | aat Asn | gct Ala | 2499 |
| gtc Val 830 | tct Ser | aca Thr | gaa Glu | cca Pro | aat Asn 835 | agt Ser | aca Thr | ggg Gly | aat Asn | cca Pro 840 | ttt Phe | caa Gln | cag Gln | aaa Lys | ctc Leu 845 | 2547 |
| caa Gln | aat Asn | gaa Glu | ttc Phe 850 | tct Ser | cta Leu | cca Pro | tcg Ser | gat Asp | atc Ile 855 | gag Glu | atg Met | cca Pro | ctg Leu | caa Gln 860 | atg Met | 2595 |
| tct Ser | aag Lys | caa Gln | aaa Lys 865 | agc Ser | aaa Lys | tca Ser | gga Gly | gtg Val 870 | aat Asn | ggg Gly | agt Ser | ttt Phe | gct Ala 875 | gct Ala | ctt Leu | 2643 |
| gag Glu | ctt Leu | tca Ser 880 | gaa Glu | gct Ala | tca Ser | gtg Val | gaa Glu 885 | tca Ser | gct Ala | ggg Gly | gca Ala | aaa Lys 890 | gct Ala | gct Ala | gca Ala | 2691 |
| tgc Cys | aga Arg 895 | act Thr | ctt Leu | tct Ser | gtt Val | ctt Leu 900 | gct Ala | tca Ser | ttg Leu | tct Ser | aat Asn 905 | aaa Lys | gtc Val | tat Tyr | agt Ser | 2739 |
| gat Asp 910 | caa Gln | gga Gly | gtt Val | cca Pro | gca Ala 915 | gcc Ala | ttt Phe | aga Arg | gtc Val | cct Pro 920 | tct Ser | ggg Gly | gct Ala | gtg Val | ata Ile 925 | 2787 |
| cca Pro | ttt Phe | gga Gly | tca Ser | atg Met 930 | gag Glu | gat Asp | gcg Ala | ctc Leu | aag Lys 935 | aaa Lys | agt Ser | gga Gly | tca Ser | ctg Leu 940 | gaa Glu | 2835 |
| tcc Ser | ttt Phe | aca Thr | agc Ser | ctt Leu | cta Leu | gaa Glu | aag Lys | att Ile | gaa Glu | aca Thr | gcc Ala | aaa Lys | gtc Val | gaa Glu | aat Asn | 2883 |

| 945 | | | | | 950 | | | | | 955 | | | | | | |
|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|------|
| ggt | gaa | ggt | gat | agc | ctg | gcg | ttg | gag | cta | caa | gca | ata | att | tca | cat | 2931 |
| Gly | Glu | Val | Asp | Ser | Leu | Ala | Leu | Glu | Leu | Gln | Ala | Ile | Ile | Ser | His | |
| | 960 | | | | | | 965 | | | | | 970 | | | | |
| ctt | tcc | cca | ccg | gag | gag | act | att | ata | ttt | ctc | aaa | aga | atc | ttc | cca | 2979 |
| Leu | Ser | Pro | Pro | Glu | Glu | Thr | Ile | Ile | Phe | Leu | Lys | Arg | Ile | Phe | Pro | |
| | 975 | | | | | 980 | | | | | 985 | | | | | |
| cag | gat | gtc | cgg | ttg | att | ggt | aga | tct | agt | gct | aat | gtg | gag | gat | ttg | 3027 |
| Gln | Asp | Val | Arg | Leu | Ile | Val | Arg | Ser | Ser | Ala | Asn | Val | Glu | Asp | Leu | |
| 990 | | | | | 995 | | | | | 1000 | | | | | 1005 | |
| gct | ggt | atg | tca | gct | gct | ggt | ctc | tat | gat | tca | att | ccc | aat | gtc | | 3072 |
| Ala | Gly | Met | Ser | Ala | Ala | Gly | Leu | Tyr | Asp | Ser | Ile | Pro | Asn | Val | | |
| | | | | 1010 | | | | | 1015 | | | | | 1020 | | |
| agt | ctc | atg | gac | cca | tgt | gcc | ttt | gga | gct | gcg | gtt | ggg | aag | gtt | | 3117 |
| Ser | Leu | Met | Asp | Pro | Cys | Ala | Phe | Gly | Ala | Ala | Val | Gly | Lys | Val | | |
| | | | | 1025 | | | | | 1030 | | | | | 1035 | | |
| tgg | gct | tct | tta | tac | aca | agg | aga | gcc | atc | cta | agc | cgt | cga | gcc | | 3162 |
| Trp | Ala | Ser | Leu | Tyr | Thr | Arg | Arg | Ala | Ile | Leu | Ser | Arg | Arg | Ala | | |
| | | | | 1040 | | | | | 1045 | | | | | 1050 | | |
| gct | ggt | gtt | tat | cag | aga | gac | gcg | aca | atg | gct | gtt | ctt | gtc | caa | | 3207 |
| Ala | Gly | Val | Tyr | Gln | Arg | Asp | Ala | Thr | Met | Ala | Val | Leu | Val | Gln | | |
| | | | | 1055 | | | | | 1060 | | | | | 1065 | | |
| gaa | ata | ctg | cag | cca | gat | ctc | tcc | ttc | gtg | ctt | cat | act | gtt | tgc | | 3252 |
| Glu | Ile | Leu | Gln | Pro | Asp | Leu | Ser | Phe | Val | Leu | His | Thr | Val | Cys | | |
| | | | | 1070 | | | | | 1075 | | | | | 1080 | | |
| ccc | gct | gac | cat | gac | ccc | aag | gtt | gtc | cag | gct | gag | gtc | gcc | cct | | 3297 |
| Pro | Ala | Asp | His | Asp | Pro | Lys | Val | Val | Gln | Ala | Glu | Val | Ala | Pro | | |
| | | | | 1085 | | | | | 1090 | | | | | 1095 | | |
| ggg | ctg | ggt | gaa | acg | ctt | gct | tca | gga | acc | cgt | ggc | acc | ccg | tgg | | 3342 |
| Gly | Leu | Gly | Glu | Thr | Leu | Ala | Ser | Gly | Thr | Arg | Gly | Thr | Pro | Trp | | |
| | | | | 1100 | | | | | 1105 | | | | | 1110 | | |
| agg | ctg | tca | tgt | aac | aaa | ttc | gat | gga | aaa | gtt | gcc | act | ctt | gcc | | 3387 |
| Arg | Leu | Ser | Cys | Asn | Lys | Phe | Asp | Gly | Lys | Val | Ala | Thr | Leu | Ala | | |
| | | | | 1115 | | | | | 1120 | | | | | 1125 | | |
| ttt | tca | aat | ttc | agt | gag | gag | atg | gtg | gtg | cac | aac | tct | ggt | cct | | 3432 |
| Phe | Ser | Asn | Phe | Ser | Glu | Glu | Met | Val | Val | His | Asn | Ser | Gly | Pro | | |
| | | | | 1130 | | | | | 1135 | | | | | 1140 | | |
| gcc | aat | gga | gaa | gta | att | cgt | ctt | act | gtt | gat | tac | agc | aag | aag | | 3477 |
| Ala | Asn | Gly | Glu | Val | Ile | Arg | Leu | Thr | Val | Asp | Tyr | Ser | Lys | Lys | | |
| | | | | 1145 | | | | | 1150 | | | | | 1155 | | |
| cca | ttg | tcg | gtt | gat | aca | acc | ttt | agg | aag | cag | ttt | ggt | cag | cga | | 3522 |
| Pro | Leu | Ser | Val | Asp | Thr | Thr | Phe | Arg | Lys | Gln | Phe | Gly | Gln | Arg | | |
| | | | | 1160 | | | | | 1165 | | | | | 1170 | | |
| ctg | gct | gcg | att | ggc | cag | tat | ctg | gag | cag | aag | ttc | ggg | agt | gca | | 3567 |
| Leu | Ala | Ala | Ile | Gly | Gln | Tyr | Leu | Glu | Gln | Lys | Phe | Gly | Ser | Ala | | |
| | | | | 1175 | | | | | 1180 | | | | | 1185 | | |
| cag | gat | gtg | gaa | ggt | tgc | ctg | gtt | ggg | aaa | gat | att | ttt | ata | gtg | | 3612 |
| Gln | Asp | Val | Glu | Gly | Cys | Leu | Val | Gly | Lys | Asp | Ile | Phe | Ile | Val | | |

| | | | | |
|--|------|------|------|------|
| | 1190 | 1195 | 1200 | |
| caa agc agg cca cag cca tag aagccgaatt c | | | | 3644 |
| Gln Ser Arg Pro Gln Pro | | | | |
| | 1205 | | | |

<210> 4

<211> 1206

<212> PRT

<213> Oryza sativa

<400> 4

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Ser | Leu | Arg | Pro | Leu | Glu | Thr | Ser | Leu | Ser | Ile | Gly | Gly | Arg |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Pro | Arg | Arg | Gly | Leu | Val | Leu | Pro | Pro | Pro | Gly | Val | Gly | Ala | Gly | Val |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Leu | Leu | Arg | Arg | Gly | Ala | Met | Ala | Leu | Pro | Gly | Arg | Arg | Gly | Phe | Ala |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Cys | Arg | Gly | Arg | Ser | Ala | Ala | Ser | Ala | Ala | Glu | Arg | Thr | Lys | Glu | Lys |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Lys | Arg | Arg | Asp | Ser | Ser | Lys | Gln | Pro | Leu | Val | His | Leu | Gln | Val | Cys |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Leu | Glu | His | Gln | Val | Lys | Phe | Gly | Glu | His | Val | Gly | Ile | Ile | Gly | Ser |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Thr | Lys | Glu | Leu | Gly | Ser | Trp | Glu | Glu | Gln | Val | Glu | Leu | Glu | Trp | Thr |
| | | | 100 | | | | | 105 | | | | | | 110 | |
| Thr | Asn | Gly | Trp | Val | Cys | Gln | Leu | Lys | Leu | Pro | Gly | Glu | Thr | Leu | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Glu | Phe | Lys | Phe | Val | Ile | Phe | Leu | Val | Gly | Gly | Lys | Asp | Lys | Ile | Trp |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Glu | Asp | Gly | Asn | Asn | Arg | Val | Val | Glu | Leu | Pro | Lys | Asp | Gly | Lys | Phe |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Asp | Ile | Val | Cys | His | Trp | Asn | Arg | Thr | Glu | Glu | Pro | Leu | Glu | Leu | Leu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Gly | Thr | Pro | Lys | Phe | Glu | Leu | Val | Gly | Glu | Ala | Glu | Lys | Asn | Thr | Gly |

| 180 | | | | | 185 | | | | | 190 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Asp | Ala | Ser | Ala | Ser | Val | Thr | Phe | Ala | Pro | Glu | Lys | Val | Gln | Asp |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ile | Ser | Val | Val | Glu | Asn | Gly | Asp | Pro | Ala | Pro | Glu | Ala | Glu | Ser | Ser |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Lys | Phe | Gly | Gly | Gln | Trp | Gln | Gly | Ser | Lys | Thr | Val | Phe | Met | Arg | Ser |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Asn | Glu | His | Leu | Asn | Lys | Glu | Ala | Asp | Arg | Met | Trp | Asp | Thr | Thr | Gly |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Leu | Asp | Gly | Ile | Ala | Leu | Lys | Leu | Val | Glu | Gly | Asp | Lys | Ala | Ser | Arg |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Asn | Trp | Trp | Arg | Lys | Leu | Glu | Val | Val | Arg | Gly | Ile | Leu | Ser | Glu | Ser |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Phe | Asp | Asp | Gln | Ser | Arg | Leu | Gly | Ala | Leu | Val | Tyr | Ser | Ala | Ile | Tyr |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Leu | Lys | Trp | Ile | Tyr | Thr | Gly | Gln | Ile | Ser | Cys | Phe | Glu | Asp | Gly | Gly |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| His | His | Arg | Pro | Asn | Lys | His | Ala | Glu | Ile | Ser | Arg | Gln | Ile | Phe | Arg |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Glu | Leu | Glu | Met | Met | Tyr | Tyr | Gly | Lys | Thr | Thr | Ser | Ala | Lys | Asp | Val |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Leu | Val | Ile | Arg | Lys | Ile | His | Pro | Phe | Leu | Pro | Ser | Phe | Lys | Ser | Glu |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Phe | Thr | Ala | Ser | Val | Pro | Leu | Thr | Arg | Ile | Arg | Asp | Ile | Ala | His | Arg |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Asn | Asp | Ile | Pro | His | Asp | Leu | Lys | Gln | Glu | Ile | Lys | His | Thr | Ile | Gln |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Asn | Lys | Leu | His | Arg | Asn | Ala | Gly | Pro | Glu | Asp | Leu | Ile | Ala | Thr | Glu |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Val | Met | Leu | Ala | Arg | Ile | Thr | Lys | Thr | Pro | Gly | Glu | Tyr | Ser | Glu | Thr |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Phe | Val | Glu | Gln | Phe | Thr | Ile | Phe | Tyr | Ser | Glu | Leu | Lys | Asp | Phe | Phe |

| 435 | | | | | 440 | | | | | 445 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Ala | Gly | Ser | Leu | Phe | Glu | Gln | Leu | Glu | Ser | Ile | Lys | Glu | Ser | Leu |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Asn | Glu | Ser | Gly | Leu | Glu | Val | Leu | Ser | Ser | Phe | Val | Glu | Thr | Lys | Arg |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Ser | Leu | Asp | Gln | Val | Asp | His | Ala | Glu | Asp | Leu | Asp | Lys | Asn | Asp | Thr |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Ile | Gln | Ile | Leu | Met | Thr | Thr | Leu | Gln | Ser | Leu | Ser | Ser | Leu | Arg | Ser |
| | | | 500 | | | | | 505 | | | | | | 510 | |
| Val | Leu | Met | Lys | Gly | Leu | Glu | Ser | Gly | Leu | Arg | Asn | Asp | Ala | Pro | Asp |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Asn | Ala | Ile | Ala | Met | Arg | Gln | Lys | Trp | Arg | Leu | Cys | Glu | Ile | Ser | Leu |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Glu | Asp | Tyr | Ser | Phe | Val | Leu | Leu | Ser | Arg | Phe | Ile | Asn | Thr | Leu | Glu |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Ala | Leu | Gly | Gly | Ser | Ala | Ser | Leu | Ala | Lys | Asp | Val | Ala | Arg | Asn | Thr |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Thr | Leu | Trp | Asp | Thr | Thr | Leu | Asp | Ala | Leu | Val | Ile | Gly | Ile | Asn | Gln |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Val | Ser | Phe | Ser | Gly | Trp | Lys | Thr | Asp | Glu | Cys | Ile | Ala | Ile | Gly | Asn |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Glu | Ile | Leu | Ser | Trp | Lys | Gln | Lys | Gly | Leu | Ser | Glu | Ser | Glu | Gly | Cys |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Glu | Asp | Gly | Lys | Tyr | Ile | Trp | Ser | Leu | Arg | Leu | Lys | Ala | Thr | Leu | Asp |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Arg | Ala | Arg | Arg | Leu | Thr | Glu | Glu | Tyr | Ser | Glu | Ala | Leu | Leu | Ser | Ile |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Phe | Pro | Glu | Lys | Val | Met | Val | Ile | Gly | Lys | Ala | Leu | Gly | Ile | Pro | Asp |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Asn | Ser | Val | Arg | Thr | Tyr | Thr | Glu | Ala | Glu | Ile | Arg | Ala | Gly | Ile | Val |
| | | 675 | | | | | 680 | | | | | 685 | | | |
| Phe | Gln | Val | Ser | Lys | Leu | Cys | Thr | Val | Leu | Gln | Lys | Ala | Ile | Arg | Glu |

690

695

700

Val Leu Gly Ser Thr Gly Trp Asp Val Leu Val Pro Gly Val Ala His
705 710 715 720

Gly Thr Leu Met Arg Val Glu Arg Ile Leu Pro Gly Ser Leu Pro Ser
725 730 735

Ser Val Lys Glu Pro Val Val Leu Ile Val Asp Lys Ala Asp Gly Asp
740 745 750

Glu Glu Val Lys Ala Ala Gly Asp Asn Ile Val Gly Val Ile Leu Leu
755 760 765

Gln Glu Leu Pro His Leu Ser His Leu Gly Val Arg Ala Arg Gln Glu
770 775 780

Asn Val Val Phe Val Thr Cys Glu Tyr Asp Asp Thr Val Thr Asp Val
785 790 795 800

Tyr Leu Leu Glu Gly Lys Tyr Ile Arg Leu Glu Ala Ser Ser Ile Asn
805 810 815

Val Asn Leu Ser Ile Val Ser Glu Lys Asn Asp Asn Ala Val Ser Thr
820 825 830

Glu Pro Asn Ser Thr Gly Asn Pro Phe Gln Gln Lys Leu Gln Asn Glu
835 840 845

Phe Ser Leu Pro Ser Asp Ile Glu Met Pro Leu Gln Met Ser Lys Gln
850 855 860

Lys Ser Lys Ser Gly Val Asn Gly Ser Phe Ala Ala Leu Glu Leu Ser
865 870 875 880

Glu Ala Ser Val Glu Ser Ala Gly Ala Lys Ala Ala Ala Cys Arg Thr
885 890 895

Leu Ser Val Leu Ala Ser Leu Ser Asn Lys Val Tyr Ser Asp Gln Gly
900 905 910

Val Pro Ala Ala Phe Arg Val Pro Ser Gly Ala Val Ile Pro Phe Gly
915 920 925

Ser Met Glu Asp Ala Leu Lys Lys Ser Gly Ser Leu Glu Ser Phe Thr
930 935 940

Ser Leu Leu Glu Lys Ile Glu Thr Ala Lys Val Glu Asn Gly Glu Val
Page 20

| | | | | | | |
|---------------------------------|---|-----------------------------|--|-----|------|-----|
| 945 | | 950 | | 955 | | 960 |
| Asp Ser Leu Ala | Leu Glu Leu Gln Ala | Ile Ile Ser His Leu Ser Pro | | | | |
| | 965 | 970 | | | 975 | |
| Pro Glu Glu Thr | Ile Ile Phe Leu Lys Arg Ile Phe Pro Gln Asp Val | | | | | |
| | 980 | 985 | | | 990 | |
| Arg Leu Ile Val Arg Ser Ser Ala | Asn Val Glu Asp Leu Ala Gly Met | | | | | |
| | 995 | 1000 | | | 1005 | |
| Ser Ala Ala Gly Leu Tyr Asp | Ser Ile Pro Asn Val Ser Leu Met | | | | | |
| | 1010 | 1015 | | | 1020 | |
| Asp Pro Cys Ala Phe Gly Ala | Ala Val Gly Lys Val Trp Ala Ser | | | | | |
| | 1025 | 1030 | | | 1035 | |
| Leu Tyr Thr Arg Arg Ala Ile | Leu Ser Arg Arg Ala Ala Gly Val | | | | | |
| | 1040 | 1045 | | | 1050 | |
| Tyr Gln Arg Asp Ala Thr Met | Ala Val Leu Val Gln Glu Ile Leu | | | | | |
| | 1055 | 1060 | | | 1065 | |
| Gln Pro Asp Leu Ser Phe Val | Leu His Thr Val Cys Pro Ala Asp | | | | | |
| | 1070 | 1075 | | | 1080 | |
| His Asp Pro Lys Val Val Gln | Ala Glu Val Ala Pro Gly Leu Gly | | | | | |
| | 1085 | 1090 | | | 1095 | |
| Glu Thr Leu Ala Ser Gly Thr | Arg Gly Thr Pro Trp Arg Leu Ser | | | | | |
| | 1100 | 1105 | | | 1110 | |
| Cys Asn Lys Phe Asp Gly Lys | Val Ala Thr Leu Ala Phe Ser Asn | | | | | |
| | 1115 | 1120 | | | 1125 | |
| Phe Ser Glu Glu Met Val Val | His Asn Ser Gly Pro Ala Asn Gly | | | | | |
| | 1130 | 1135 | | | 1140 | |
| Glu Val Ile Arg Leu Thr Val | Asp Tyr Ser Lys Lys Pro Leu Ser | | | | | |
| | 1145 | 1150 | | | 1155 | |
| Val Asp Thr Thr Phe Arg Lys | Gln Phe Gly Gln Arg Leu Ala Ala | | | | | |
| | 1160 | 1165 | | | 1170 | |
| Ile Gly Gln Tyr Leu Glu Gln | Lys Phe Gly Ser Ala Gln Asp Val | | | | | |
| | 1175 | 1180 | | | 1185 | |
| Glu Gly Cys Leu Val Gly Lys | Asp Ile Phe Ile Val Gln Ser Arg | | | | | |

1190

1195

1200

Pro Gln Pro
1205

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<211> 12

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Val Glu Ala Glu Val Ala Pro
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<210> 8

<211> 9

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His Thr Val Ser Pro Ser Asp His Asp
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<210> 9

<211> 807

<212> DNA

<213> Hordeum vulgare

<220>

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<222> (3)..(590)

<223>

<400> 9

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Ala Arg Gly Val Leu Pro Asn Val Ser Leu Ser Asp Pro Thr Asn
1 5 10 15

ttc ggg tct gca gta gcg cgg gtc tgg gcc tcg ctg tac act cgg agg 95
Phe Gly Ser Ala Val Ala Arg Val Trp Ala Ser Leu Tyr Thr Arg Arg
20 25 30

gcc atc ctc agc cgc cgg gtg gct ggc gtg ccc cag agg gac gcc aag 143
Ala Ile Leu Ser Arg Arg Val Ala Gly Val Pro Gln Arg Asp Ala Lys
35 40 45

atg gct gtc ctg gtg cag gag atg ctg gag cca gag cta tcc ttc gtg 191
Met Ala Val Leu Val Gln Glu Met Leu Glu Pro Glu Leu Ser Phe Val
50 55 60

ctc cac acg gtc agc ccc tcg gac cac gac acc agg gtc gtc gag gct 239
Leu His Thr Val Ser Pro Ser Asp His Asp Thr Arg Val Val Glu Ala
65 70 75

gag gtt gcc ccg ggg ctg ggc gag acc ctt gcc gct ggc acc cgc ggc 287
Glu Val Ala Pro Gly Leu Gly Glu Thr Leu Ala Ala Gly Thr Arg Gly
80 85 90 95

acc ccg tgg cgt ctc tcc tgc gac aag ttc gac acc gac gtc gcc acc 335
Thr Pro Trp Arg Leu Ser Cys Asp Lys Phe Asp Thr Asp Val Ala Thr
100 105 110

ctg gcc ttc gcc aac ttc agt gag gag atg cgg gtg ctc ggc tcg ggc 383
Leu Ala Phe Ala Asn Phe Ser Glu Glu Met Arg Val Leu Gly Ser Gly
115 120 125

ccc gcc gac ggc gag gtg gtg agg ctc act gtc gac tac agc acg aag 431
Pro Ala Asp Gly Glu Val Val Arg Leu Thr Val Asp Tyr Ser Thr Lys
130 135 140

| | |
|---|-----|
| ctg ctc tcc gtc gac agg acc ttc agg cag aag ttc ggt cag cgg ctg | 479 |
| Leu Leu Ser Val Asp Arg Thr Phe Arg Gln Lys Phe Gly Gln Arg Leu | |
| 145 150 155 | |
| gcc gcc gtg ggg cag tac ctg gag cag agg ttc ggg agc gcc cag gac | 527 |
| Ala Ala Val Gly Gln Tyr Leu Glu Gln Arg Phe Gly Ser Ala Gln Asp | |
| 160 165 170 175 | |
| gtg gag ggc tgc atg gtc tgg gaa gac atc tac ata gtg cag agc atg | 575 |
| Val Glu Gly Cys Met Val Trp Glu Asp Ile Tyr Ile Val Gln Ser Met | |
| 180 185 190 | |
| cca caa ccg ctg tag agtcatccgt aataatgttt agatgagcaa agttttggtt | 630 |
| Pro Gln Pro Leu | |
| 195 | |
| ggtgaaataa aatttgccga aaatcccatg gcaaaataag tcaggtatga agagcccgcc | 690 |
| tgcgaaacca actgattcta aataatgttt tgaattcgtg tttaaattat gggacgtgaa | 750 |
| caatgatttc cttggaatgc atgcattgta agtttttaaaa aaaaaaaaaa aaaaaaa | 807 |

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<211> 195

<212> PRT

<213> Hordeum vulgare

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| 1 5 10 15 | |
| Gly Ser Ala Val Ala Arg Val Trp Ala Ser Leu Tyr Thr Arg Arg Ala | |
| 20 25 30 | |
| Ile Leu Ser Arg Arg Val Ala Gly Val Pro Gln Arg Asp Ala Lys Met | |
| 35 40 45 | |
| Ala Val Leu Val Gln Glu Met Leu Glu Pro Glu Leu Ser Phe Val Leu | |
| 50 55 60 | |
| His Thr Val Ser Pro Ser Asp His Asp Thr Arg Val Val Glu Ala Glu | |
| 65 70 75 80 | |
| Val Ala Pro Gly Leu Gly Glu Thr Leu Ala Ala Gly Thr Arg Gly Thr | |
| 85 90 95 | |
| Pro Trp Arg Leu Ser Cys Asp Lys Phe Asp Thr Asp Val Ala Thr Leu | |
| 100 105 110 | |
| Ala Phe Ala Asn Phe Ser Glu Glu Met Arg Val Leu Gly Ser Gly Pro | |

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| | 115 | | 120 | | 125 |
| Ala | Asp | Gly | Glu | Val | Val |
| | 130 | | | Arg | Leu |
| | | | | 135 | Thr |
| | | | | | Val |
| | | | | Asp | Tyr |
| | | | | 140 | Ser |
| | | | | | Thr |
| | | | | | Lys |
| | | | | | Leu |
| Leu | Ser | Val | Asp | Arg | Thr |
| 145 | | | | 150 | Phe |
| | | | | | Arg |
| | | | | | Gln |
| | | | | | Lys |
| | | | | | Phe |
| | | | | | 155 |
| | | | | | Gly |
| | | | | | Gln |
| | | | | | Arg |
| | | | | | Leu |
| | | | | | Ala |
| Ala | Val | Gly | Gln | Tyr | Leu |
| | | | | 165 | Glu |
| | | | | | Gln |
| | | | | | Arg |
| | | | | | Phe |
| | | | | | 170 |
| | | | | | Gly |
| | | | | | Ser |
| | | | | | Ala |
| | | | | | Gln |
| | | | | | Asp |
| | | | | | 175 |
| | | | | | Val |
| Glu | Gly | Cys | Met | Val | Trp |
| | | | | | Glu |
| | | | | | Asp |
| | | | | | 180 |
| | | | | | Ile |
| | | | | | 185 |
| | | | | | Tyr |
| | | | | | Ile |
| | | | | | Val |
| | | | | | Gln |
| | | | | | Ser |
| | | | | | 190 |
| | | | | | Met |
| | | | | | Pro |
| Gln | Pro | Leu | | | |
| | | 195 | | | |

<210> 11

<211> 9

<212> PRT

<213> Solanum tuberosum

<400> 11

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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<210> 12

<211> 7

<212> PRT

<213> Solanum tuberosum

<400> 12

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| 1 | | | | 5 | | |

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<211> 7

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Arg Phe Val Asn Ala Val Glu
1 5

<210> 14

<211> 7

<212> PRT

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<210> 15

<211> 403

<212> DNA

<213> Solanum tuberosum

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<400> 15

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| gcg | gat | gct | tca | ata | gct | atg | cgt | cag | aag | tgg | cgt | ctc | tgc | gaa | atc | 48 |
| Ala | Asp | Ala | Ser | Ile | Ala | Met | Arg | Gln | Lys | Trp | Arg | Leu | Cys | Glu | Ile | |
| 1 | | | | 5 | | | | 10 | | | | | 15 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| ggg | ctt | gaa | gac | tat | gca | ttt | gtt | ctt | ttg | agc | agg | ttt | gtg | aat | gca | 96 |
| Gly | Leu | Glu | Asp | Tyr | Ala | Phe | Val | Leu | Leu | Ser | Arg | Phe | Val | Asn | Ala | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gtt | gaa | gct | cta | ggc | gga | gct | gat | tgg | ctt | gca | gag | aat | gta | aca | gtg | 144 |
| Val | Glu | Ala | Leu | Gly | Gly | Ala | Asp | Trp | Leu | Ala | Glu | Asn | Val | Thr | Val | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| aaa | aac | att | agt | tct | tgg | aat | gat | cca | att | gga | gca | ctt | aca | gtt | gga | 192 |
| Lys | Asn | Ile | Ser | Ser | Trp | Asn | Asp | Pro | Ile | Gly | Ala | Leu | Thr | Val | Gly | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| atc | caa | cag | cta | ggc | ata | tct | ggc | tgg | aag | ccc | gag | gaa | tgc | aaa | gct | 240 |
| Ile | Gln | Gln | Leu | Gly | Ile | Ser | Gly | Trp | Lys | Pro | Glu | Glu | Cys | Lys | Ala | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |

| | |
|---|-----|
| gtt gga aat gaa ctt ttg tca tgg aaa gaa agg ggt att tca gaa att | 288 |
| Val Gly Asn Glu Leu Leu Ser Trp Lys Glu Arg Gly Ile Ser Glu Ile | |
| 85 90 95 | |
| gaa ggc agc gaa gat ggt aag act ata tgg gca tta aga cta aaa gcg | 336 |
| Glu Gly Ser Glu Asp Gly Lys Thr Ile Trp Ala Leu Arg Leu Lys Ala | |
| 100 105 110 | |
| act ctt gat aga agt cga agg tta act gag gag tat tcc gag aca ctt | 384 |
| Thr Leu Asp Arg Ser Arg Arg Leu Thr Glu Glu Tyr Ser Glu Thr Leu | |
| 115 120 125 | |
| ctc caa ata ttc cct gaa a | 403 |
| Leu Gln Ile Phe Pro Glu | |
| 130 | |

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<211> 134

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<213> Solanum tuberosum

<400> 16

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| Gly Leu Glu Asp Tyr Ala Phe Val Leu Leu Ser Arg Phe Val Asn Ala |
| 20 25 30 |
| Val Glu Ala Leu Gly Gly Ala Asp Trp Leu Ala Glu Asn Val Thr Val |
| 35 40 45 |
| Lys Asn Ile Ser Ser Trp Asn Asp Pro Ile Gly Ala Leu Thr Val Gly |
| 50 55 60 |
| Ile Gln Gln Leu Gly Ile Ser Gly Trp Lys Pro Glu Glu Cys Lys Ala |
| 65 70 75 80 |
| Val Gly Asn Glu Leu Leu Ser Trp Lys Glu Arg Gly Ile Ser Glu Ile |
| 85 90 95 |
| Glu Gly Ser Glu Asp Gly Lys Thr Ile Trp Ala Leu Arg Leu Lys Ala |
| 100 105 110 |
| Thr Leu Asp Arg Ser Arg Arg Leu Thr Glu Glu Tyr Ser Glu Thr Leu |
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| Leu Gln Ile Phe Pro Glu |
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1 5

<210> 18

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<212> PRT

<213> Sorghum bicolor

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Asp Ala Pro Asp Ser Ala Ile Ala
1 5

<210> 19

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<213> Sorghum bicolor

<400> 19

Ile Pro Glu Asn Ser Val Arg Thr Tyr
1 5

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Val Asn Lys Ala Asp Gly
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<210> 21

<211> 1526

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<213> Sorghum bicolor

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<221> CDS

<222> (2)..(1525)

<223>

<400> 21

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| g | cac | gag | gct | gaa | tat | ggt | cat | gat | cag | agt | cac | ctg | gag | gct | ctt | aca | 49 |
| His | Glu | Ala | Glu | Tyr | Val | His | Asp | Gln | Ser | His | Leu | Glu | Ala | Leu | Thr | | |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| tat | tct | gca | ata | tat | cta | aag | tgg | ata | tat | act | ggt | caa | ata | cca | tgc | 97 |
| Tyr | Ser | Ala | Ile | Tyr | Leu | Lys | Trp | Ile | Tyr | Thr | Gly | Gln | Ile | Pro | Cys | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttt | gag | gat | ggt | ggt | cac | cat | cga | ccc | aat | aaa | cat | gct | gag | ata | tcc | 145 |
| Phe | Glu | Asp | Gly | Gly | His | His | Arg | Pro | Asn | Lys | His | Ala | Glu | Ile | Ser | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
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| agg | caa | att | ttt | cgt | gaa | att | gaa | agg | ata | tac | tat | ggg | gaa | aac | aca | 193 |
| Arg | Gln | Ile | Phe | Arg | Glu | Ile | Glu | Arg | Ile | Tyr | Tyr | Gly | Glu | Asn | Thr | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
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| tca | gct | cag | gat | ttg | ctt | gtg | ata | cgc | aag | att | cat | cct | tgt | cta | cct | 241 |
| Ser | Ala | Gln | Asp | Leu | Leu | Val | Ile | Arg | Lys | Ile | His | Pro | Cys | Leu | Pro | |
| 65 | | | | 70 | | | | | | 75 | | | | | 80 | |

| | | | | | | | | | | | | | | | | |
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| tca | ttt | aaa | tca | gaa | ttt | act | gcc | tct | gtt | cct | cta | aca | cga | att | cgt | 289 |
| Ser | Phe | Lys | Ser | Glu | Phe | Thr | Ala | Ser | Val | Pro | Leu | Thr | Arg | Ile | Arg | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |

| | | | | | | | | | | | | | | | | |
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| gat | att | gct | cat | cgt | aat | gac | ata | cca | cat | gat | ctc | aag | caa | gaa | atc | 337 |
| Asp | Ile | Ala | His | Arg | Asn | Asp | Ile | Pro | His | Asp | Leu | Lys | Gln | Glu | Ile | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |

| | | | | | | | | | | | | | | | | |
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| aag | cat | act | ata | caa | aac | aag | ctt | cac | cgg | aat | gcc | ggc | cct | gag | gat | 385 |
| Lys | His | Thr | Ile | Gln | Asn | Lys | Leu | His | Arg | Asn | Ala | Gly | Pro | Glu | Asp | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |

| | | | | | | | | | | | | | | | | |
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| ctt | att | gct | act | gaa | gcc | atg | ctt | gct | agg | att | act | aag | act | cct | gga | 433 |
| Leu | Ile | Ala | Thr | Glu | Ala | Met | Leu | Ala | Arg | Ile | Thr | Lys | Thr | Pro | Gly | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |

| | | | | | | | | | | | | | | | | |
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| gag | tac | agt | gaa | gct | ttt | gtt | gaa | caa | ttc | aag | acg | ttt | tat | agt | gaa | 481 |
| Glu | Tyr | Ser | Glu | Ala | Phe | Val | Glu | Gln | Phe | Lys | Thr | Phe | Tyr | Ser | Glu | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |

| | | | | | | | | | | | | | | | | |
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| tta | aaa | gat | ttc | ttc | aat | gct | ggc | agc | cta | ctg | gag | caa | gtg | caa | tcc | 529 |
| Leu | Lys | Asp | Phe | Phe | Asn | Ala | Gly | Ser | Leu | Leu | Glu | Gln | Val | Gln | Ser | |
| | | | | | | | | | | | | | | | | |

| 165 | | | | | | | 170 | | | | | | | 175 | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|------|
| atc | gag | caa | tct | ttg | gat | gag | tct | ggc | tta | gaa | gct | ctc | tca | tcc | ttt | | | | | | 577 |
| Ile | Glu | Gln | Ser | Leu | Asp | Glu | Ser | Gly | Leu | Glu | Ala | Leu | Ser | Ser | Phe | | | | | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | | | | | |
| ctg | aaa | acc | aaa | aag | aat | tta | gac | caa | ctg | gaa | gat | gca | aaa | gat | ttg | | | | | | 625 |
| Leu | Lys | Thr | Lys | Lys | Asn | Leu | Asp | Gln | Leu | Glu | Asp | Ala | Lys | Asp | Leu | | | | | | |
| | | | 195 | | | | 200 | | | | | 205 | | | | | | | | | |
| gat | gaa | aat | ggt | ggc | ggt | caa | ggt | ttg | ttg | aaa | gcc | ttg | ctg | tcg | tta | | | | | | 673 |
| Asp | Glu | Asn | Gly | Gly | Val | Gln | Val | Leu | Leu | Lys | Ala | Leu | Leu | Ser | Leu | | | | | | |
| | | | 210 | | | | 215 | | | | | 220 | | | | | | | | | |
| tct | tat | cta | aga | tca | att | cta | atg | aag | ggt | ctg | gaa | agt | ggc | ctt | aga | | | | | | 721 |
| Ser | Tyr | Leu | Arg | Ser | Ile | Leu | Met | Lys | Gly | Leu | Glu | Ser | Gly | Leu | Arg | | | | | | |
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| aat | gat | gct | cca | gat | agt | gct | att | gca | atg | cga | caa | aag | tgg | cgt | ctt | | | | | | 769 |
| Asn | Asp | Ala | Pro | Asp | Ser | Ala | Ile | Ala | Met | Arg | Gln | Lys | Trp | Arg | Leu | | | | | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | | | | | |
| tgt | gag | atc | ggg | ctt | gaa | gat | tat | tcg | ttt | gta | ttg | tta | agt | aga | tac | | | | | | 817 |
| Cys | Glu | Ile | Gly | Leu | Glu | Asp | Tyr | Ser | Phe | Val | Leu | Leu | Ser | Arg | Tyr | | | | | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | | | | | |
| atc | aat | gct | ctt | gaa | gct | ttg | ggt | gga | tca | gct | tca | ctt | gca | gag | ggt | | | | | | 865 |
| Ile | Asn | Ala | Leu | Glu | Ala | Leu | Gly | Gly | Ser | Ala | Ser | Leu | Ala | Glu | Gly | | | | | | |
| | | | 275 | | | | 280 | | | | | 285 | | | | | | | | | |
| ctt | cct | aca | aat | aca | agt | cta | tgg | gat | gat | gcc | ctt | gat | gcc | ctt | gtc | | | | | | 913 |
| Leu | Pro | Thr | Asn | Thr | Ser | Leu | Trp | Asp | Asp | Ala | Leu | Asp | Ala | Leu | Val | | | | | | |
| | | | 290 | | | 295 | | | | | 300 | | | | | | | | | | |
| att | ggc | ata | aat | caa | ggt | agc | ttt | tca | gga | tgg | aaa | cca | aat | gag | tgt | | | | | | 961 |
| Ile | Gly | Ile | Asn | Gln | Val | Ser | Phe | Ser | Gly | Trp | Lys | Pro | Asn | Glu | Cys | | | | | | |
| | | | 305 | | 310 | | | | 315 | | | | | 320 | | | | | | | |
| act | gca | ata | gtg | aat | gag | ctt | ctt | tct | tgg | aag | cag | aaa | ggt | cta | tct | | | | | | 1009 |
| Thr | Ala | Ile | Val | Asn | Glu | Leu | Leu | Ser | Trp | Lys | Gln | Lys | Gly | Leu | Ser | | | | | | |
| | | | | 325 | | | | | 330 | | | | | 335 | | | | | | | |
| gaa | ttt | gaa | ggc | agt | gag | gat | gga | aag | tat | att | tgg | gca | ctg | aga | ctc | | | | | | 1057 |
| Glu | Phe | Glu | Gly | Ser | Glu | Asp | Gly | Lys | Tyr | Ile | Trp | Ala | Leu | Arg | Leu | | | | | | |
| | | | 340 | | | | 345 | | | | | | 350 | | | | | | | | |
| aaa | gcc | act | ctt | gat | aga | tca | cga | aga | cta | aca | gaa | gaa | tac | tct | gaa | | | | | | 1105 |
| Lys | Ala | Thr | Leu | Asp | Arg | Ser | Arg | Arg | Leu | Thr | Glu | Glu | Tyr | Ser | Glu | | | | | | |
| | | | 355 | | | | 360 | | | | | 365 | | | | | | | | | |
| gca | ctt | ctt | tct | ata | ttt | cct | gaa | aaa | gtc | aag | ggt | ctt | ggg | aaa | gcc | | | | | | 1153 |
| Ala | Leu | Leu | Ser | Ile | Phe | Pro | Glu | Lys | Val | Lys | Val | Leu | Gly | Lys | Ala | | | | | | |
| | | | 370 | | | 375 | | | | | 380 | | | | | | | | | | |
| ctt | gga | ata | cca | gag | aac | agt | gtg | aga | aca | tac | act | gaa | gct | gaa | att | | | | | | 1201 |
| Leu | Gly | Ile | Pro | Glu | Asn | Ser | Val | Arg | Thr | Tyr | Thr | Glu | Ala | Glu | Ile | | | | | | |
| | | | | | 390 | | | | | 395 | | | | | 400 | | | | | | |
| cgt | gct | ggt | ggt | att | ttt | cac | gtc | tcg | aaa | ctt | tgc | act | gta | ctt | tta | | | | | | 1249 |
| Arg | Ala | Gly | Val | Ile | Phe | His | Val | Ser | Lys | Leu | Cys | Thr | Val | Leu | Leu | | | | | | |
| | | | | 405 | | | | | 410 | | | | | 415 | | | | | | | |
| aaa | gca | act | cga | gca | ggt | ctt | gga | tcg | tct | gtg | tgg | gat | ggt | ctt | ggt | | | | | | 1297 |
| Lys | Ala | Thr | Arg | Ala | Val | Leu | Gly | Ser | Ser | Val | Trp | Asp | Val | Leu | Val | | | | | | |

| 420 | | | | | | 425 | | | | | | 430 | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|
| cct | gga | gtg | gcc | cat | gga | gcc | ttg | ata | cag | gtt | gaa | aga | ata | gct | cct | 1345 | | |
| Pro | Gly | Val | Ala | His | Gly | Ala | Leu | Ile | Gln | Val | Glu | Arg | Ile | Ala | Pro | | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | | |
| gga | tca | ttg | cca | tca | tcc | atc | aaa | gaa | cct | gtc | gtg | cta | gtt | gta | aac | 1393 | | |
| Gly | Ser | Leu | Pro | Ser | Ser | Ile | Lys | Glu | Pro | Val | Val | Leu | Val | Val | Asn | | | |
| | 450 | | | | | 455 | | | | | 460 | | | | | | | |
| aag | gct | gat | gga | gat | gaa | gag | gtc | aaa | gct | gct | ggg | gat | aac | ata | gtg | 1441 | | |
| Lys | Ala | Asp | Gly | Asp | Glu | Glu | Val | Lys | Ala | Ala | Gly | Asp | Asn | Ile | Val | | | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | | | |
| ggt | gtt | att | ctt | cta | caa | gaa | tta | cct | cac | cta | tca | cat | ctt | ggt | gtt | 1489 | | |
| Gly | Val | Ile | Leu | Leu | Gln | Glu | Leu | Pro | His | Leu | Ser | His | Leu | Gly | Val | | | |
| | | | 485 | | | | | | 490 | | | | | 495 | | | | |
| aga | gct | cgt | caa | gag | aaa | gtt | gta | ttt | gta | act | tgc | g | | | | 1526 | | |
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| His | Glu | Ala | Glu | Tyr | Val | His | Asp | Gln | Ser | His | Leu | Glu | Ala | Leu | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Tyr | Ser | Ala | Ile | Tyr | Leu | Lys | Trp | Ile | Tyr | Thr | Gly | Gln | Ile | Pro | Cys |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Phe | Glu | Asp | Gly | Gly | His | His | Arg | Pro | Asn | Lys | His | Ala | Glu | Ile | Ser |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Arg | Gln | Ile | Phe | Arg | Glu | Ile | Glu | Arg | Ile | Tyr | Tyr | Gly | Glu | Asn | Thr |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Ser | Ala | Gln | Asp | Leu | Leu | Val | Ile | Arg | Lys | Ile | His | Pro | Cys | Leu | Pro |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ser | Phe | Lys | Ser | Glu | Phe | Thr | Ala | Ser | Val | Pro | Leu | Thr | Arg | Ile | Arg |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Asp | Ile | Ala | His | Arg | Asn | Asp | Ile | Pro | His | Asp | Leu | Lys | Gln | Glu | Ile |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Lys | His | Thr | Ile | Gln | Asn | Lys | Leu | His | Arg | Asn | Ala | Gly | Pro | Glu | Asp |

| 115 | | | | | | 120 | | | | | | 125 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Leu | Ile | Ala | Thr | Glu | Ala | Met | Leu | Ala | Arg | Ile | Thr | Lys | Thr | Pro | Gly | | |
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| Glu | Tyr | Ser | Glu | Ala | Phe | Val | Glu | Gln | Phe | Lys | Thr | Phe | Tyr | Ser | Glu | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Leu | Lys | Asp | Phe | Phe | Asn | Ala | Gly | Ser | Leu | Leu | Glu | Gln | Val | Gln | Ser | | |
| | | | | 165 | | | | | 170 | | | | | 175 | | | |
| Ile | Glu | Gln | Ser | Leu | Asp | Glu | Ser | Gly | Leu | Glu | Ala | Leu | Ser | Ser | Phe | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Leu | Lys | Thr | Lys | Lys | Asn | Leu | Asp | Gln | Leu | Glu | Asp | Ala | Lys | Asp | Leu | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Asp | Glu | Asn | Gly | Gly | Val | Gln | Val | Leu | Leu | Lys | Ala | Leu | Leu | Ser | Leu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Ser | Tyr | Leu | Arg | Ser | Ile | Leu | Met | Lys | Gly | Leu | Glu | Ser | Gly | Leu | Arg | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Asn | Asp | Ala | Pro | Asp | Ser | Ala | Ile | Ala | Met | Arg | Gln | Lys | Trp | Arg | Leu | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Cys | Glu | Ile | Gly | Leu | Glu | Asp | Tyr | Ser | Phe | Val | Leu | Leu | Ser | Arg | Tyr | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Ile | Asn | Ala | Leu | Glu | Ala | Leu | Gly | Gly | Ser | Ala | Ser | Leu | Ala | Glu | Gly | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| Leu | Pro | Thr | Asn | Thr | Ser | Leu | Trp | Asp | Asp | Ala | Leu | Asp | Ala | Leu | Val | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | |
| Ile | Gly | Ile | Asn | Gln | Val | Ser | Phe | Ser | Gly | Trp | Lys | Pro | Asn | Glu | Cys | | |
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| Thr | Ala | Ile | Val | Asn | Glu | Leu | Leu | Ser | Trp | Lys | Gln | Lys | Gly | Leu | Ser | | |
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| Glu | Phe | Glu | Gly | Ser | Glu | Asp | Gly | Lys | Tyr | Ile | Trp | Ala | Leu | Arg | Leu | | |
| | | | 340 | | | | | 345 | | | | | 350 | | | | |
| Lys | Ala | Thr | Leu | Asp | Arg | Ser | Arg | Arg | Leu | Thr | Glu | Glu | Tyr | Ser | Glu | | |
| | | 355 | | | | | 360 | | | | | 365 | | | | | |
| Ala | Leu | Leu | Ser | Ile | Phe | Pro | Glu | Lys | Val | Lys | Val | Leu | Gly | Lys | Ala | | |

370

375

380

Leu Gly Ile Pro Glu Asn Ser Val Arg Thr Tyr Thr Glu Ala Glu Ile
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Arg Ala Gly Val Ile Phe His Val Ser Lys Leu Cys Thr Val Leu Leu
 405 410 415

Lys Ala Thr Arg Ala Val Leu Gly Ser Ser Val Trp Asp Val Leu Val
 420 425 430

Pro Gly Val Ala His Gly Ala Leu Ile Gln Val Glu Arg Ile Ala Pro
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Gly Ser Leu Pro Ser Ser Ile Lys Glu Pro Val Val Leu Val Val Asn
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Lys Ala Asp Gly Asp Glu Glu Val Lys Ala Ala Gly Asp Asn Ile Val
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| Asn | Gly | Ala | Phe | Val | Glu | Gln | Phe | Gln | Ile | Phe | Tyr | Ser | Glu | Leu | Lys | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |

| | | | | | | | | | | | | | | | | |
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| gac | ttc | ttt | aat | gcc | ggc | agc | ctg | ttt | gaa | caa | ctg | gaa | tcc | atc | aag | 96 |
| Asp | Phe | Phe | Asn | Ala | Gly | Ser | Leu | Phe | Glu | Gln | Leu | Glu | Ser | Ile | Lys | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | | |
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| gaa | tct | ttg | aat | gat | tct | ggc | tta | gaa | gca | ctg | tca | tca | ttt | gtc | aaa | 144 |
| Glu | Ser | Leu | Asn | Asp | Ser | Gly | Leu | Glu | Ala | Leu | Ser | Ser | Phe | Val | Lys | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| acc | aaa | cag | agt | ttg | gac | caa | gtg | gat | gct | gcg | aac | att | caa | gtt | gtg | 192 |
| Thr | Lys | Gln | Ser | Leu | Asp | Gln | Val | Asp | Ala | Ala | Asn | Ile | Gln | Val | Val | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| atg | aag | acc | ttg | cag | tca | ttg | tct | tca | ttg | aga | tca | gtt | cta | atg | aag | 240 |
| Met | Lys | Thr | Leu | Gln | Ser | Leu | Ser | Ser | Leu | Arg | Ser | Val | Leu | Met | Lys | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |

| | | | | | | | | | | | | | | | | |
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| ggc | ctt | gaa | agt | ggc | ctt | aga | aat | gat | gcg | act | gat | gcc | ggg | ata | gca | 288 |
| Gly | Leu | Glu | Ser | Gly | Leu | Arg | Asn | Asp | Ala | Thr | Asp | Ala | Gly | Ile | Ala | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |

| | | | | | | | | | | | | | | | | |
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| atg | cga | caa | aag | tgg | cgc | ctt | tgt | gag | att | ggg | ctt | gag | gat | tat | tct | 336 |
| Met | Arg | Gln | Lys | Trp | Arg | Leu | Cys | Glu | Ile | Gly | Leu | Glu | Asp | Tyr | Ser | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttt | gtt | ttg | tta | agc | aga | tat | atc | aat | ggg | ctt | gaa | gct | tca | ggg | gga | 384 |
| Phe | Val | Leu | Leu | Ser | Arg | Tyr | Ile | Asn | Gly | Leu | Glu | Ala | Ser | Gly | Gly | |
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| | | | | | | | | | | | | | | | | |
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| tca | gct | tca | ctt | gca | caa | tgt | gtg | gct | gga | aat | aca | agt | gta | tgg | gac | 432 |
| Ser | Ala | Ser | Leu | Ala | Gln | Cys | Val | Ala | Gly | Asn | Thr | Ser | Val | Trp | Asp | |
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| | | | | | | | | | | | | | | | | |
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| Asp | Thr | Leu | Asp | Ala | Leu | Ile | Ile | Gly | Val | Asn | Gln | Val | Ser | Phe | Ser | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |

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Glu Ser Leu Asn Asp Ser Gly Leu Glu Ala Leu Ser Ser Phe Val Lys
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Thr Lys Gln Ser Leu Asp Gln Val Asp Ala Ala Asn Ile Gln Val Val
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Met Lys Thr Leu Gln Ser Leu Ser Ser Leu Arg Ser Val Leu Met Lys
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Gly Leu Glu Ser Gly Leu Arg Asn Asp Ala Thr Asp Ala Gly Ile Ala
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Met Arg Gln Lys Trp Arg Leu Cys Glu Ile Gly Leu Glu Asp Tyr Ser
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Phe Val Leu Leu Ser Arg Tyr Ile Asn Gly Leu Glu Ala Ser Gly Gly
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Ser Ala Ser Leu Ala Gln Cys Val Ala Gly Asn Thr Ser Val Trp Asp
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